Brominated fullerenes as precursors in the formation of fluorofullerenes. $C_{60}F_{18}$ Langmuir-Blodgett films.

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It was reported recently that reaction of $C_{60}Br_{24}$ with xenon difluoride in the anhydrous hydrofluoric acid results in the formation of $C_{60}F_{24}$. At the same time, fluorination with the use of BrF_5 under the same conditions led to the formation of $C_{60}Br_4F_{20.}$ [1]. Authors [2] applied BrF_3 for the substitution of bromine atoms in $C_{60}Br_{24}$ in the synthesis of $C_{60}F_{24}$. Obtained samples were characterized by chemical analysis, X-ray Photoemission and IR Spectroscopy [1,2].

In order to synthesize fluorinated [60]fullerenes with low fluorine content we studied reactions of $C_{60}Br_{24}$ and $C_{60}Br_8$ with xenon difluoride. Initial $C_{60}Br_{24}$ and $C_{60}Br_8$ were prepared by direct bromination of C_{60} at room temperature as it was described in [3] and [4], respectively. Fluorination was carried out in the sealed copper tubes, no solvents were used in the experiments. Obtained yellow samples were characterized with the use of IR spectroscopy and EI and LDI mass spectrometry. We varied time and temperature of the fluorination and obtained the mixtures of the fluorinated products $C_{60}F_n$, n=2-22 with $C_{60}F_{18}O$ and $C_{60}F_{18}$ as dominant products.

The Langmuir-Blodgett (LB) technique allows one to make ultra-thin films, use of C_{60} as LB material was described elsewhere [5]. As for the halogenated fullerenes, their physical properties have not been fully investigated yet. We applied the LB technique to one of the most interesting fluorofullerenes $C_{60}F_{18}$ [6]. The pressure-area isotherm shows that $C_{60}F_{18}$ could form stable monolayers at the air-water interface. Dielectric, photoelectric properties, Shtark effect and the absorption spectra of the deposited LB films were investigated, along with the STM study.

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